Federal Communications Commission

Office of Engineering and Technology

Laboratory Division

Antenna Calibration Procedures

Test laboratories performing radiated emission measurements and normalized site attenuation (NSA) measurements, as required by the FCC rules, should use antennas calibrated in accordance with ANSI C63.5-2006, *American National Standard Electromagnetic Compatibility-Radiated Emission Measurements in Electromagnetic Interference (EMI) Control-Calibration of Antennas (9kHz to 40 GHz).*

At the present time the FCC rules cross-reference the measurement procedures in ANSI C63.4-2003.[1] In a recent Public Notice the FCC announced that for the purposes of measurements to determine compliance of Part 15 radio-frequency devices, applicants can use the procedures of ANSI C63.4-2003, the revised ANSI C63.4-2009, or the new ANSI C63.10-2009, as applicable.[2]

ANSI C63.4-2003 edition allows two alternatives for antenna calibration, *i.e.*, using either ANSI C63.5-1988 or ANSI C63.5-1998. However, the new edition ANSI C63.4-2009 cross-references only the latest edition of ANSI C63.5-2006. The Office of Engineering and Technology (OET) has been notified by the Accredited Standards Committee C63®–Electromagnetic Compatibility that the most current edition of the antenna calibration standard is ANSI C63.5-2006.

ANSI C63.5-2006 provides procedures for calibrating antennas that are needed to: a) measure radiated emissions from certain types of radio-frequency devices which are then compared to FCC limits to determine product compliance, and b) to perform NSA measurements.

Considerable work was done by C63® to update the antenna calibration procedures of the 1988, 1998, and 2004 editions of ANSI C63.5, and to harmonize where possible with similar work ongoing in IEC/CISPR. Another outcome of that work was to focus on a single antenna calibration technique, not the two that are referenced in the ANSI C63.4-2003 earlier edition. The results of that work were published as the ANSI C63.5-2006 edition.

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[1] *See* 47 C.F.R. Section 15.31(a)(3) regarding general compliance measurement procedures. In addition, 47 C.F.R. Section 2.948(b)(8) requires that site attenuation data be taken pursuant to the procedures contained in ANSI C63.4-2001.

[2] *See* Public Notice DA 09-2478. The Commission indicated therein that pending a future rulemaking to update the rules, it will accept test data for radiated emissions and NSA performed using the procedures in ANSI C63.4-2009.

To avoid confusion due to cross-references to multiple standards, this KDB publication clarifies that test laboratories performing radiated emission measurements and NSA measurements, as required by the FCC rules, should use antennas calibrated in accordance with ANSI C63.5-2006.

It is useful to note that the calibration procedure outlined in ANSI C63.5-2006 is based solely on horizontally polarized measurements performed at a standard antenna calibration site, with a measurement distance of 10 meters.[3] These antenna factors can then be used for either vertically or horizontally polarized measurements at distances from the equipment-under-test of 3 meters or more, in accordance with the applicable procedures of ANSI C63.4-2003, ANSI C63.4-2009, or ANSI C63.10-2009.

[3] *See* C63.5-2006 clause 4.3 for standard antenna calibration site requirements.